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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
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09/586,561

06/02/2000

Juha Ylitalo

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EXAMINER

WILLIAMS, LAWRENCE B

ART UNIT

PAPER NUMBER

2634

DATE MAILED: 04/21/2005

Please find below and/or attached an Office communication concerning this application or proceeding.

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Office Action Summary

Application No.

09/586,561

Applicant(s)

YLITALO ET AL.

Examiner

Lawrence B Williams

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-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133).
- Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 08 April 2004.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1-17;26-42 is/are pending in the application.
- 4a) Of the above claim(s) _____ is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☒ Claim(s) 1-17,26,27,39 and 40 is/are rejected.
- 7) ☒ Claim(s) 28-38 is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☒ The specification is objected to by the Examiner.
- 10) ☒ The drawing(s) filed on 02 November 2004 is/are: a) ☒ accepted or b) ☐ objected to by the Examiner.
- Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
- 11) ☐ The proposed drawing correction filed on _____ is: a) ☐ approved b) ☐ disapproved by the Examiner.
- If approved, corrected drawings are required in reply to this Office action.
- 12) ☐ The oath or declaration is objected to by the Examiner.

Priority under 35 U.S.C. §§ 119 and 120

- 13) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some * c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
2. ☐ Certified copies of the priority documents have been received in Application No. _____.
3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).
- * See the attached detailed Office action for a list of the certified copies not received.
- 14) ☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. § 119(e) (to a provisional application).
- a) ☐ The translation of the foreign language provisional application has been received.
- 15) ☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. §§ 120 and/or 121.

Attachment(s)

- 1) ☒ Notice of References Cited (PTO-892) 4) ☐ Interview Summary (PTO-413) Paper No(s). _____
- 2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948) 5) ☐ Notice of Informal Patent Application (PTO-152)
- 3) ☒ Information Disclosure Statement(s) (PTO-1449) Paper No(s) 11/02/04 6) ☐ Other:

12/10/04

DETAILED ACTION

Response to Arguments

1. The affidavit filed on 02 November 2004 under 37 CFR 1.131 is sufficient to overcome the Hottinen reference.
2. Applicant's arguments with respect to claims 1-17 and 26-42 have been considered but are moot in view of the new ground(s) of rejection.

Claim Objections

3. Claim 12 is objected to because of the following informalities: Examiner suggests applicant replace the phrase "a t" with "at" in line 8.
4. Claim 32 is objected to because of the following informalities: Examiner suggests applicant rewrite the phrase "wherein the circuitry to send of the transmitter" for clarification purposes.

Appropriate correction is required.

Claim Rejections - 35 USC § 112

5. The following is a quotation of the second paragraph of 35 U.S.C. 112:

The specification shall conclude with one or more claims particularly pointing out and distinctly claiming the subject matter, which the applicant regards as his invention.

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6. Claims 1-17 are rejected under 35 U.S.C. 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention. Applicant's claim 1 recites the limitation, "determining complex channel state information based on the received space-time coded signals". It is unclear in the claim language exactly where the "determining complex channel state information" takes place, ie. in a transceiver, receiver or a second station. Examiner suggests applicant clarify this matter.

Claim Rejections - 35 USC § 102

7. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(e) the invention was described in a patent granted on an application for patent by another filed in the United States before the invention thereof by the applicant for patent, or on an international application by another who has fulfilled the requirements of paragraphs (1), (2), and (4) of section 371(c) of this title before the invention thereof by the applicant for patent.

The changes made to 35 U.S.C. 102(e) by the American Inventors Protection Act of 1999 (AIPA) and the Intellectual Property and High Technology Technical Amendments Act of 2002 do not apply when the reference is a U.S. patent resulting directly or indirectly from an international application filed before November 29, 2000. Therefore, the prior art date of the reference is determined under 35 U.S.C. 102(e) prior to the amendment by the AIPA (pre-AIPA 35 U.S.C. 102(e)).

8. Claims 1, 2, 26, 27 are rejected under 35 U.S.C. 102(e) as being anticipated by Dabak et al. (US Patent 6,594,473).

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(1) With regard to claim 1, Dabak et al. discloses in Fig. 4, a method comprising steps of receiving at least two space-time coded signals from an antenna system associated with a first station; determining complex channel state information based on the received space-time coded signals; and sending the complex channel state information (col. 9, line 30-col. 10, line 12).

Dabak et al. teaches a closed loop diversity aspect of his invention which incorporates the UST, (user station) receiving output signals from AT1 and AT2, making a channel estimate (determining complex channel state information) and transmitting this estimate back to the base station (BST) via a feedback channel (50₂).

(2) With regard to claim 2, claim 2 inherits all limitations of claim 1 above. Furthermore, Dabak et al. discloses in Fig. 8, the method further comprising a step of segmenting the complex channel state information into a plurality of channel state information segments, wherein the step of sending the complex channel state information includes sending the plurality of channel state information segments in a sequence (col. 15, lines 33-36).

(3) With regard to claim 26, Dabak et al. discloses in Fig. 4, a system comprising a remote station, the remote station including: a receiver to receive at least two space-time coded signals from an antenna system (AT1, AT2); a processor (50) to determine complex channel state information from the received space-time coded signals; and a transmitter (UST) to send the complex channel state information to a base station.

(4) With regard to claim 27, claim 27 inherits all limitations of claim 2 and 26.

Claim Rejections - 35 USC § 103

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9. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

10. Claims 14 and 39 are rejected under 35 U.S.C. 102(e) as anticipated by or, in the alternative, under 35 U.S.C. 103(a) as obvious over Dabak et al. (US Patent 6,594,473 B1).

(1) With regard to claim 14, claim 14 inherits all limitations of claim 1 above. As noted above, Dabak et al. discloses all limitations of claim 1 above. Furthermore, Dabak et al. also discloses the method of claim 1, further comprising a step of transmitting the first and second space-time coded signals with first and second signature codes embedded in the respective first and second space-time coded signals the first and second signature codes being substantially orthogonal so that a second station can separate a composite signal into the first and second space-time coded signals, wherein the step of receiving receives the first and second space-time coded signals as the composite signal at the second station (col. 3, line 60 – col. 4, line 3). Though, Dabak et al. does not explicitly teach the signature codes being substantially orthogonal, it is well known in the art as well as other methods as noted by Dabak et al. for separating a composite signal.

(2) With regard to claim 39, claim 39 inherits all limitations of claim 26 above. As noted above, Dabak et al. discloses all limitations of claim 26 above. Furthermore, Dabak et al. also discloses in Fig. 4, wherein the base station (BST) includes the antenna system (AT1, AT2) and a transmitter (42) coupled to the antenna system, the transmitter of the base station transmitting the first and second space-time coded signals through the antenna system with first and second

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signature codes embedded in the respective first and second space-time coded signals, the first and second signature codes being substantially orthogonal so that the remote station can separate a composite signal into the first and second space-time coded signals (col. 3, lines 60-col. 4, line 50); and the receiver of the remote station includes circuitry (48) to receive the first and second space-time coded signals as the composite signals. Though, Dabak et al. does not explicitly teach the signature codes being substantially orthogonal, it is well known in the art as well as other methods as noted by Dabak et al. for separating a composite signal.

11. Claims 15, 40 are rejected under 35 U.S.C. 103(a) as being unpatentable over Dabak et al. (US Patent 6,594,473 B1 as applied to claims 1 and 26 above, and further in view of Weerackody (US Patent 5,848,103).

(1) With regard to claim 15, claim 15 inherits all limitations of claim 1 above. Dabak et al. does not explicitly disclose wherein the complex channel state information includes at least one weight, each weight including amplitude and phase angle information. However, Weerackody teaches a method for providing time diversity wherein complex channel state information includes at least one weight, each weight including amplitude and phase angle information (col. 3, lines 25-34; col. 6, lines 8-11).

Therefore it would have been obvious to skilled in the art at the time of invention to incorporate the teachings of Weerackody with the teachings of Dabak et al. as a method of mitigating the detrimental effects of fading (col. 2, lines 52-62).

(2) With regard to claim 40, claim 40 inherits all limitations of claim 15 and 26 above.

Allowable Subject Matter

12. The following is a statement of reasons for the indication of allowable subject matter:

The instant application discloses a method and system for receiving at least two space-time coded signals from an antenna system. A search of prior art records has failed to disclose a method “wherein the step of segmenting the channel state information includes: determining a number of phase bits allocated for phase information according to a mode of operation; rounding and truncating a correction phase angle to fit into the number of phase bits; determining a number of amplitude bits allocated for amplitude information according to the mode of operation; and rounding and truncating a correction amplitude according to the number of amplitude bits” as disclosed in claim 2. Nor does the prior art teach of a system comprising; “logic to determine a number of phase bits allocated for phase information according to a mode of operation; logic to round and truncate a correction phase angle to fit into the number of phase bits; logic to determine a number of amplitude bits allocated for amplitude information according to the mode of operation; and logic to round and truncate a correction amplitude according to the number of amplitude bits as disclosed in claim 28.

13. Claims 3-13, 17 are objected to as being dependent upon a rejected base claim, but would be allowable if rewritten in independent form including all of the limitations of the base claim and any intervening claims if rewritten to overcome the rejection(s) under 35 U.S.C. 112, 2nd paragraph, set forth in this Office action and to include all of the limitations of the base claim and any intervening claims.

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14. Claims 28-38, 41, 42 are objected to as being dependent upon a rejected base claim, but would be allowable if rewritten in independent form including all of the limitations of the base claim and any intervening claims.

Conclusion

15. The prior art made of record and not relied upon is considered pertinent to applicant's disclosure.

a.) Gesbert et al. discloses in US 6,377,819 B1 Wireless Communication System Using Joined Transmit And Receive Processing.

b.) Ylitalo et al. discloses in US Patent 6,788,661 B1 Adaptive Beam-Forming Coding Method And Apparatus.

c.) Ariyavisitakul et al. discloses in US Patent 6,473,393 B1 Channel Estimation For OFDM Systems With Transmitter Diversity.

d.) Barratt et al. discloses in US Patent 6,185,440 B1 Method For Sequentially Transmitting A Downlink Signal from A Communication Station That Has An Antenna array To Achieve An Omnidirectional Radiation.

16. Any inquiry concerning this communication or earlier communications from the examiner should be directed to Lawrence B Williams whose telephone number is 571-272-3037. The examiner can normally be reached on Monday-Friday (8:00-5:00).

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If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Stephen Chin can be reached on 571-272-3056. The fax phone number for the organization where this application or proceeding is assigned is 703-872-9306.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

Lawrence B. Williams

lbw

April 18, 2005


AMANDA T. LE
PRIMARY EXAMINER